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STATISTICAL METHODS IN SURVEY WORK

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VITAL statistics serve a two-fold purpose. They show where to look for causes of bad health conditions, and they demonstrate the success or failure of remedial measures where applied. The record of deaths in a city, year by year, may show a constantly high death rate from typhoid fever—a rate double that of other cities of similar size. An examination of the city water and milk supply may reveal conditions that explain the high death rate. It may be necessary, however, to investigate premises in various sections of the city—the surface wells and drainage, the sewer connection and the garbage removal. The cause may finally be located in the use of surface wells and the lack of sewer connections. If it is shown that one-half or two-thirds of the families are using these surface wells polluted by the lack of sewer connections, it amounts to a demonstration to the city authorities as to the source of the typhoid germs. The method of prevention is clear, and when adopted the typhoid rate declines fifty per cent. This new statistical record is evidence of the success of the plan, and those who were obliged to make improvements required by law feel that the requirements were just.

It is the purpose of this paper to emphasize the importance of vital statistics over smaller unit areas, and to make clearer the reason why we must at present depend upon special investigations for most of our detailed information on social and health conditions.

STUDIES NEEDED ON HEALTH PROBLEMS

Our present health reports are inadequate for social purposes. Statistics is the bookkeeping of the public health movement. The head of a business firm asks of his bookkeeper more than a statement of general results. He wishes to know what lines of effort have yielded the best returns and what, if any, have been conducted at a loss. He wishes to know the weak spots in his system of business administration in order that efforts may be concentrated at those points. Likewise, the health department of a city should ask of its bookkeeping division what causes of death are increasing and what are decreasing in the community as a whole. But the explanation of the increase or decrease frequently involves a study of smaller portions of the community in order to discover a particular set of conditions operating. The department is anxious to find out what lines of effort are most effective in decreasing disease and saving lives; what occupations are so dangerous to health as to require legislative interference to protect employes; in what sections of the city, or among what nationality, or under what sort of industrial and living conditions the mortality rate of infants is high. Does the crowding of population, as shown by the number of persons per room, result in a higher death rate? Do bad sanitation and ignorance affect the problem? What is the relation of pure milk supply to health? What is the effect of establishing milk stations? What trades are especially dangerous from the point of view of tuberculosis? Is one nationality more susceptible to the disease than another? How do bad housing and ventilation affect the problem? Is the death rate lower where hospitals and sanatoria have been provided for dangerous cases and where nursing and instruction are given in the home?

At present few of these questions are adequately answered through the records and reports of health departments. It is not sufficient to give general death rates for a city or even a ward of a city. The divisions must be smaller so as to show differences in health associated with differences in housing, sanitation, nationality, working conditions, and special provisions for pure water and milk supply. The answers are left to special inquiries into the housing, sanitation, milk supply and factory conditions of certain sections of the city, and the correlation of the health records with these facts.

NEED FOR CORRELATION OF VITAL STATISTICS AND POPULATION STATISTICS

In order to arrive at a measure of progress in sanitation and health, rates must be computed for successive periods of time. This cannot be done without a record of population to which we may relate vital statistics. It is not enough to have simply total population for the city or ward. It is necessary to distinguish by sex, by age and conjugal condition and by nationality. Further, it is exceedingly desirable to have this census of population by smaller divisions than boroughs or wards. It is only by intensive study of localities having certain living and working conditions and certain classes of population, and by comparison of these localities with others having different environmental and human conditions that we can secure the information on which to base a program of future social action on health problems.

Before the present census it was the hope of statisticians and social workers that the population facts of our large cities would be tabulated and published by smaller tracts than wards or assembly districts,—for instance, by forty or eighty-acre areas, which would cover from eight to twenty Manhattan blocks. The director of the census states that the enumerations have been made for New York city by forty or eighty-acre tracts, but by reason of inadequate appropriation the results cannot be published for such tracts. The publication by the bureau of the census will be by assembly districts only.

The chief objection to the assembly district as a unit is that it is political and is, therefore, subject to change. There is no assurance that it will cover the same area at the next succeeding census. If it does not, we cannot compare the death and birth-rates for the two periods without the danger of serious error. Besides, we wish to know, at successive periods, the changes in population over the same area, the changes in nationality, in crowding, in sanitation, in living and working conditions, so that we may relate these changes to changes in the birth and death rates, accident and sickness rates, thus measuring sanitary and health progress.

Besides, the assembly district is too large in many cases. In order really to make evident relations of cause and effect in health problems, intensive study of the local situation is frequently the only method. It then becomes possible to apply remedial measures intelligently to the sanitary, housing or working conditions. It is easy for bad conditions in water or milk supply or in housing and sanitation over a narrow area to exaggerate the death rate for a whole ward or assembly district. The remedy must be applied where the bad conditions are localized.

For New York City it is possible to secure population facts for the smaller areas only by private initiative or at city expense. The Federation of Churches, under the direction of Dr. Walter Laidlaw, has divided the city into smaller tracts—not, however, of uniform size—and has sent thirteen clerks to Washington to secure the detailed tabulations by these areas from the schedules. In the division of records of the health department the vital statistics may be tabulated by houses, blocks, or any areas desired, but the annual health reports give most of their figures for the city as a whole or by boroughs, and very little of the detail even by wards. The next problem will be, even if Dr. Laidlaw succeeds in making his tabulations available for public use, to secure coöperation with the health and tenement-house departments, to have their data tabulated by the same areas in order that population and vital statistics may be related without the need of additional special tabulations from the health records. Thus the outlook for publication of health statistics useful for social purposes is not promising in New York City. The health reports are two years behind, the special studies are intermittent and lack continuity, the published facts are for too large areas to be most useful for social purposes, and it is not possible to relate them to population facts for smaller areas than the boroughs or assembly districts, the latter not being used by the health department for its tabulations. The need is for a research department within the bureau of records to study these special problems and bring together facts of population and facts of vital statistics in local special studies to test the results and efficiency of health expenditures in the past and to indicate new lines of effort in protecting the public health for the future.

NEED FOR PUBLICITY

It is not enough to have a careful investigation of the causes of infant mortality, or of the facts as to the birth rate, or of the data on the prevalence of tuberculosis, or of the information concerning the nature and extent of industrial accidents. These facts must be put in convincing form and must be used to inform the public. On the basis of these data public opinion must support or condemn policies for the conservation of health. The public looks in vain among the pages of the average health report for information which will furnish convincing proof or disproof of the efficiency of past policies and which will guide to an intelligent shaping of future policy. The public needs to be informed in regard to the meaning and purpose of the work of the health department. One aim should be, and is, to teach the individual citizen how to protect his health and that of his family. This requires a weekly or monthly bulletin so popularized as to educate at least the leaders in the public health movement, *i. e.*, physicians, teachers, clergymen and social workers. The newspaper is being used to great advantage. The graphic method is effective in reaching the eyes of those who will not read.

What has been said concerning health data is largely true of other social facts. We know the area of the wards of a city and can easily calculate the density of population per acre, but we know comparatively little about the number of persons living per room and the extent of increase in room-crowding in certain districts. The latter is the vital information for most purposes, because density per acre does not take into consideration the height of the tenements or the amount of space used in each acre for factory or commercial purposes. Furthermore, an average per room for a large area is of little value, because this may fail to show seriously overcrowded conditions in certain narrow localities, where overcrowding may seriously affect the welfare of the population.

We may have a fairly accurate estimate of the number of industrial accidents in a community, and this knowledge may be sufficient to arouse us to action. But this is not enough knowledge upon which to base a program of prevention or compensation. It is necessary to locate the dangerous operations in the various industries, to know the hours and speed of work, the experience of the injured workers, the hour of the day when the most accidents occur, as well as the number of hours at work before the accident, the safety devices employed, the instructions given, the nature and duration of disability, and other similar facts, before schemes of prevention and insurance can be intelligently worked out. We look in vain in most official reports for material upon the basis of which accident rates can be computed because the numbers employed in specific operations, in supposedly dangerous industries, are not known. A larger absolute number of accidents does not stamp a trade as specially dangerous if a larger number of men is employed in that trade, and yet in legislation it would not be possible to uphold preventive legislation applied to a specific dangerous operation unless it could be conclusively shown that it was specially dangerous to health and safety. There is little uniformity in the published facts about accidents, so that comparison is impossible. We have now a movement for a uniform schedule of accident reporting, but we need uniform classification for published reports as well as uniform collections of facts.

Statistical records often show us where to look for the causes of social maladjustments, as was pointed out at the beginning of this paper. A survey of conditions in a community and a careful record of the findings which can be recorded in statistical form ought to be a useful guide in any preventive campaign. It is for this reason that the quantitative study of social phenomena is attracting wider and wider attention at the present time. But this is not the entire function of statistical data in relation to social problems. They are testing instruments for the schemes of social reform in operation. They measure the success or failure of a program that has been adopted. This being the case, it is a responsible matter to plan out a survey of community conditions, so far as the methods to be used are concerned. The survey finds the conditions to be of a particular nature at a given period. The important social question is, what will their nature be at a period ten years in the future? It is a great function of the survey to reveal actual conditions in order to build up public opinion by education on the great social responsibilities. It is an important service to hold public officials up to a test of their efficiency at the particular time at which the survey is made. But this, it would appear, is not the only, or even the greatest function of the survey, because those who are making it possible for the community to know itself to-day wish to furnish methods and plans by which the same community may keep a check on its conditions year by year, in the future, and thus make the knowledge a permanent possession.